

Harding Lawson Associates



October 21, 1998

Ms. Jeanne-Marie Bruno, P.E.
Acting Associate Director of Water Quality
Metropolitan Water District of Southern California
350 South Grand Avenue
Los Angeles, CA 90054

Re: Response
"Comments on Phase I Treatability Study Draft Report, Perchlorate
in Groundwater, Baldwin Park Operable Unit, San Gabriel Basin"

Dear Ms. Bruno:

Attached you will find two copies of our revised report "Draft Final Phase 1 Treatability Study Report, Perchlorate in Groundwater, Baldwin Park Operable Unit, San Gabriel Basin." We believe that this revised report addresses your (Metropolitan Water District of Southern California [Metropolitan]) comments dated June 22, 1998. Comments made by the U.S. Environmental Protection Agency (EPA) and the Baldwin Park Operable Unit Steering Committee's (BPOUSC) responses to these comments are included as Appendices G and H of the report. Our responses to your specific comments are detailed below. A revised Phase 2 Treatability Study Work Plan will follow under separate cover.

1.0 General Comments

1. Metropolitan understood the subject study was designed to demonstrate an anoxic biological treatment technology for perchlorate to treat groundwater with low perchlorate levels to achieve 18 ug/L perchlorate limit or lower. This Phase I study was not intended to demonstrate that the product water met all Title 22 drinking water quality regulations. Therefore, all statements suggesting the treated water from the treatment technology for perchlorate removal will meet Title 22 drinking water regulations should be deleted or modified.

Response: We agree. Although the Phase I study included an analysis of bioreactor effluent for primary and secondary water quality parameters on 5/18 and 6/15/98, it was not an objective of this testing to produce potable water that met all Title 22 drinking water regulations. To accomplish this, and to fully evaluate the effectiveness of filtration and disinfection technologies, these unit processes must be part of the treatment train. Testing of filtration and disinfection technologies, the formation of disinfection-by-products (DBP), biological regrowth, and the formation of intermediate by-products will be addressed during the Phase 2-perchlorate treatability study. The report has been modified in accordance with: "The study demonstrated that water produced from the intended treatment train will potentially meet State and Federal potable water standards. Additional work is needed to evaluate disinfection and filtration and demonstrate that the treatment processes will reliably produce potable water."

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2. The subject study demonstrates that an anoxic biological treatment technology using a GAC/FB reactor is promising to reduce perchlorate levels from a range between 25 ug/L and 57 ug/L to below the detection limit (<4 ug/L). However, this study did not provide information regarding the treatment process reliability, the operational margin of safety, and the stability of the treatment performance.

Response: We agree. The Phase 1 was not designed to evaluate process reliability, the operational margin of safety, and the stability of the treatment performance. The Phase 2 study is designed to evaluate these parameters in more detail.

3. Some water quality issues such as the formation of disinfection by-products, biological regrowth due to high nutrient levels in the product water (ethanol, methanol, total phosphorus, and ammonia nitrogen), and intermediate by-products from biodegradation were not addressed.

Response: We agree. See the response to General Comment (1).

4. It is suggested that references should be provided for all equations listed in the report.

Response: This has been completed where applicable.

2.0 Specific Comments

1. Page v. The subject study did not analyze any pathogens and disinfection by-products or investigate the biological regrowth issue in the distribution systems; therefore, the fifth bullet under the study objectives accomplished is not a true statement and should be modified.

Response: We agree. See response to General Comment (1). The text has been revised to "the study demonstrated that water produced from the intended treatment train will potentially meet State and Federal potable water standards. Additional work is needed to evaluate disinfection and filtration and demonstrate that the treatment processes will reliably produce potable water."

2. Page 1, paragraph one, lines one to four. Metropolitan is to assist the Three Valleys Municipal Water District in this BPOU project; therefore, the statement should be changed to ".....(EPA) and Three Valleys Municipal District (TVMWD) in association with Metropolitan Water District of Southern California (MWD)....."

Response: The text has been modified as requested.

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3. Page 1, Paragraph four, lines six to seven. Metropolitan's criteria for acceptance of treated water into the distribution systems include that the downstream customers determine the acceptable perchlorate level in Metropolitan's distribution system. The U.S. Air Force toxicity study results may not change the aforementioned criteria. If the downstream customers demand that the perchlorate level in Metropolitan's distribution systems be very low or non-detect, a treatment process for perchlorate removal may be required regardless of the level of reference for dose (RfD) for perchlorate. The statement needs to be modified.

Response: The text has been revised to "The U.S. Air Force with EPA review is presently performing toxicity studies that will be the basis for a revised Reference Dose (RfD), which will in turn be evaluated to develop an enforceable water quality standard. In addition, the demands of water users may affect the decision whether to treat for perchlorate. Once this numerical value is established and the demands of water users have been evaluated, a determination regarding whether BPOU groundwater must be treated for perchlorate can be made."

4. Page 3, Paragraph five (under Subtitle 2.4 Evaluation Different Source of Microorganism [sic]) lines six to eight – the waste sludge from the food processing industry is not necessarily lacking the pathogens. Please clarify the statement to characterize the waste sludge.

Response: Aerojet conducted characterization of the innoculum sludge in a previous study. This characterization indicated the sludge lacked human pathogens such as fecal coliform and coliform. Unfortunately, no specific characterization of the innoculum sludge was conducted in this study; however, we did characterize the bioreactor effluent for total bacteria, total coliform, and fecal coliform. This provides an indirect characterization of the innoculum sludge. We will directly characterize the innoculum sludge as part of the Phase 2-perchlorate treatability study.

5. Page 4, paragraph five, lines two to three. What is the commercial name of coal-based carbon used? How much was added to the system?

Response: Approximately 300 pounds of a specialized coal-based carbon was added to the bioreactor. Calgon developed the carbon for Envirex for use in fluidized beds. The carbon is a 10x30 mesh but has a more uniform size distribution to increase carbon retention in the bed.

6. Page 14, the fifth bullet under Subtitle 6.0. Same as comment (1).

Response: see Specific Comment (1) response.

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7. Page 14, the sixth bullet under Subtitle 6.0. No demonstration of the conceptual model with the actual results was described in this report.

Response: The conceptual model refers to the expected kinetic model: oxygen depletion > nitrate reduction > perchlorate reduction. This is well supported by the data. The fluidized bioreactor model has been removed from the report. Initial perchlorate concentrations were so low that it was not possible to gather sufficient data to confirm the model.

8. Page 14, the ninth bullet under Subtitle 6.0. Since the detection limit for ethanol is 5 mg/L, it is inappropriate to state that "little to no ethanol in the effluent."

Response: The text has been modified to reflect the detection limit of 5 mg/L for ethanol.

3.0 Conclusion

The subject study successfully determined the reduction of perchlorate below detection limits; however, it did not demonstrate the potability of the product water produced from an anoxic biological treatment process. Metropolitan will be glad to work with the BPOU Steering Committee to resolve our concerns.

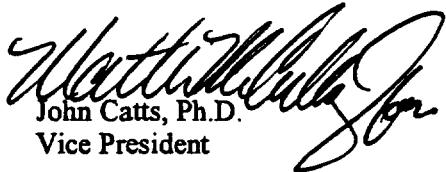
Response: We agree and look forward to working with Metropolitan to resolve outstanding concerns. As you are aware, the scope and objectives of the Phase 1 study were limited. The study primarily was intended to demonstrate that perchlorate could be reduced from concentrations similar to those present in the San Gabriel Valley to less than the laboratory detection limit of 4 ug/L. Additional objectives were to evaluate nitrate reduction, to evaluate a different source of microorganisms, and to evaluate the potability of treated water. Although this pilot-scale study included the analysis of bioreactor effluent for the range of water quality parameters used to regulate potable water, it was not an objective of this testing to produce potable water. To produce potable water, it was not an objective of this testing to produce potable water. To produce potable water and to fully evaluate the effectiveness of filtration and disinfection technologies, these unit processes must be part of the treatment train. Testing of filtration and disinfection technologies will be performed during a Phase 2-perchlorate treatability study.

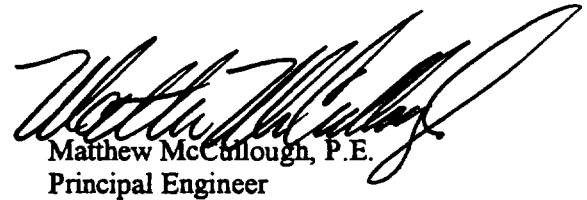
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Thank you for the opportunity to respond to your comments. Responses to your department's comments on the Phase 2 Treatability Study Work Plan will follow under separate cover. Please call John Catts at (415) 899-8825 or Matthew McCullough (949) 260-1800 if we can assist you in any way.

Yours very truly,

HARDING LAWSON ASSOCIATES


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Vice President


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Principal Engineer